**Messerschmitt Me 262**

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| **Me 262 *Schwalbe*** |
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| Messerschmitt Me 262A |
| **Role** | Fighter |
| **Manufacturer** | [Messerschmitt](http://en.wikipedia.org/wiki/Messerschmitt) |
| **First flight** | 18 April 1941 with piston engine18 July 1942 with jet engines  |
| **Introduction** | April 1944  |
| **Retired** | 1945, [*Luftwaffe*](http://en.wikipedia.org/wiki/Luftwaffe)1951, Czechoslovakia |
| **Primary users** | [*Luftwaffe*](http://en.wikipedia.org/wiki/Luftwaffe)[Czechoslovak Air Force](http://en.wikipedia.org/wiki/Czechoslovak_Air_Force) (S-92) |
| **Number built** | 1,430 |

The [**Messerschmitt**](http://en.wikipedia.org/wiki/Messerschmitt) **Me 262 *Schwalbe*** ("[Swallow](http://en.wikipedia.org/wiki/Swallow)") was the world's first operational [jet-powered](http://en.wikipedia.org/wiki/Turbojet) [fighter aircraft](http://en.wikipedia.org/wiki/Fighter_aircraft). Design work started before [World War II](http://en.wikipedia.org/wiki/World_War_II) opened, but engine problems meant the aircraft did not reach operational status until the summer of 1944. Compared with Allied fighters of its day, including the jet-powered [Gloster Meteor](http://en.wikipedia.org/wiki/Gloster_Meteor) which entered service a little earlier, it was much faster and packed a much heavier punch.

In combat, when properly flown, it proved difficult to counter. It was able to outrun its Allied counterparts by as much as 100 mph. Me 262 pilots claimed a total of 509 Allied kills (although higher claims are sometimes made) against the loss of about 100 Me 262s. As the only aircraft in [*Luftwaffe*](http://en.wikipedia.org/wiki/Luftwaffe) service able to operate safely at that point in the war, the design was pressed into a variety of roles, including [light bomber](http://en.wikipedia.org/wiki/Light_bomber), [reconnaissance](http://en.wikipedia.org/wiki/Aerial_reconnaissance) and even experimental [night fighter](http://en.wikipedia.org/wiki/Night_fighter) versions.

The Me 262 is considered to have been the most advanced German aviation design in operational use during World War II. The Allies countered its potential effectiveness in the air by relentlessly attacking the aircraft on the ground, or while they were taking off or landing. Maintenance during the deteriorating war situation and a lack of fuel also reduced the effectiveness of the aircraft as a fighting force. In the end, the Me 262 had a negligible impact on the course of the war due to its late introduction and the small numbers that were deployed in operational service.

The Me 262 influenced the designs of post-war aircraft such as the [North American F-86](http://en.wikipedia.org/wiki/North_American_F-86) and [Boeing B-47](http://en.wikipedia.org/wiki/Boeing_B-47).

**Design and development**

[Hans Guido Mutke](http://en.wikipedia.org/wiki/Hans_Guido_Mutke)'s Me 262A on display at the [Deutsches Museum](http://en.wikipedia.org/wiki/Deutsches_Museum)

The Me 262 was already being developed as *Projekt* P.1065 before the start of World War II. Plans were first drawn up in April 1939, and the original design was very similar to the plane that eventually entered service. The progression of the original design into service was delayed greatly by technical issues involving the new jet engines. Funding for the jet program was also initially lacking as many high-ranking officials thought the war could easily be won with conventional aircraft. Among those was [Hermann Göring](http://en.wikipedia.org/wiki/Hermann_G%C3%B6ring), head of the *Luftwaffe*, who cut back the engine development program to just 35 engineers in February 1940, [Willy Messerschmitt](http://en.wikipedia.org/wiki/Willy_Messerschmitt), who desired to maintain mass production of the [Bf 109](http://en.wikipedia.org/wiki/Messerschmitt_Bf_109) and the projected [Me 209](http://en.wikipedia.org/wiki/Messerschmitt_Me_209-II), and [Major General](http://en.wikipedia.org/wiki/Major_General) [Adolf Galland](http://en.wikipedia.org/wiki/Adolf_Galland), who supported Messerschmitt through the early development years, flying the Me 262 himself on 22 April 1943. By that time problems with engine development had slowed production of the aircraft considerably.

In mid-1943 [Adolf Hitler](http://en.wikipedia.org/wiki/Adolf_Hitler) envisioned the Me 262 as an offensive [ground-attack](http://en.wikipedia.org/wiki/Ground-attack_aircraft)/bomber rather than a defensive interceptor, as a high speed, light payload [*Schnellbomber*](http://en.wikipedia.org/wiki/Schnellbomber) ("Fast Bomber"), to penetrate Allied [air superiority](http://en.wikipedia.org/wiki/Air_superiority) during the expected invasion of France. His edict resulted in the development of (and concentration on) the *Sturmvogel* variant. It is debatable to what extent Hitler's interference extended the delay in bringing the *Schwalbe* into operation. [Albert Speer](http://en.wikipedia.org/wiki/Albert_Speer), then Minister of Armaments and War Production, claimed in [his memoirs](http://en.wikipedia.org/wiki/Inside_the_Third_Reich) that Hitler originally blocked mass-production of the Me 262 before agreeing to production in early 1944. He rejected arguments that the plane would be more effective as a fighter against Allied bombers then destroying large parts of Germany and wanted it as a bomber for revenge attacks. According to Speer Hitler had felt that its superior speed compared to other fighters of the era meant that it couldn't be attacked and so had preferred it for high altitude straight flying.

Although it is often stated the Me 262 is a "[swept wing](http://en.wikipedia.org/wiki/Swept_wing)" design, the production Me 262 had a [leading edge](http://en.wikipedia.org/wiki/Leading_edge) sweep of only 18.5°. This was done after the initial design of the aircraft, when the engines proved to be heavier than originally expected, primarily to position the center of lift properly relative to the center of mass, not for the aerodynamic benefit of increasing the [critical Mach number](http://en.wikipedia.org/wiki/Critical_Mach_number) of the wing, where the sweep was too slight to achieve any significant advantage. On 1 March 1940, instead of moving the wing forward on its mount, the outer wing was repositioned slightly aft. The trailing edge of the mid-section of the wing remained not swept. Based on data from the AVA [Göttingen](http://en.wikipedia.org/wiki/G%C3%B6ttingen) and wind tunnel results, the middle section's leading edge was later swept to the same angle as the outer panels.

The first test flights began on 18 April 1941, with the Me 262 V1 example, bearing its *Stammkennzeichen* radio code letters of PC+UA, but since its intended [BMW 003](http://en.wikipedia.org/wiki/BMW_003) turbojets were not ready for fitting, a conventional [Junkers Jumo 210](http://en.wikipedia.org/wiki/Junkers_Jumo_210) engine was mounted in the V1 prototype's nose, driving a propeller, to test the Me 262 V1 airframe. When the BMW 003 engines were finally installed, the Jumo was retained for safety, which proved wise as both 003s failed during the first flight and the pilot had to land using the nose-mounted engine alone.

Messerschmitt Me 262 *Schwalbe* - this captured airframe, Wrknr. 111711, *FE-0107*, *711*, crashed ~two miles S of [Xenia, Ohio](http://en.wikipedia.org/wiki/Xenia%2C_Ohio), 20 August 1946, test pilot Walter J. McAuley, Jr., of the Flight Performance Section, Flight Test Division, [Wright Field](http://en.wikipedia.org/wiki/Wright_Field), Ohio, successfully parachuting to safety. This brand new airframe had been surrendered on 31 March 1945 by Messerschmitt test pilot Hans Fay who defected during a functional check flight rather than fly it to an operational unit, landing at [Rhein-Main](http://en.wikipedia.org/wiki/Rhein-Main), [Frankfurt](http://en.wikipedia.org/wiki/Frankfurt), the first Me 262 to fall into Allied hands.

The V3 third prototype [airframe](http://en.wikipedia.org/wiki/Airframe), with the code PC+UC, became a true "jet" when it flew on 18 July 1942 in [Leipheim](http://en.wikipedia.org/wiki/Leipheim) near [Günzburg](http://en.wikipedia.org/wiki/G%C3%BCnzburg_%28district%29), Germany, piloted by [Fritz Wendel](http://en.wikipedia.org/wiki/Fritz_Wendel). This was almost nine months ahead of the British [Gloster Meteor](http://en.wikipedia.org/wiki/Gloster_Meteor)'s first flight on 5 March 1943. The [conventional gear](http://en.wikipedia.org/wiki/Conventional_gear), forcing a tail-down attitude on the ground, of the Me 262 V3 caused its jet exhaust to deflect off the runway, with the wing's turbulence negating the effects of the [elevators](http://en.wikipedia.org/wiki/Elevator_%28aircraft%29) in the tail-down attitude, and the first attempt was cut short. On the second attempt, Wendel solved the problem by tapping the aircraft's brakes at takeoff speed, lifting the horizontal tail above and out of the wing's turbulence.

The aircraft was originally designed with a [tailwheel undercarriage](http://en.wikipedia.org/wiki/Conventional_landing_gear) and the first four [prototypes](http://en.wikipedia.org/wiki/Prototype) (Me 262 V1-V4) were built with this configuration, but it was discovered on an early test run that the engines and wings "blanked" the [stabilizers](http://en.wikipedia.org/wiki/Stabilizer_%28aircraft%29), giving almost no control on the ground, as well as serious runway surface damage from the hot jet exhaust. Changing to a [tricycle undercarriage](http://en.wikipedia.org/wiki/Tricycle_gear) arrangement, initially a fixed undercarriage on the "V5" fifth prototype, then fully retractable on the sixth (V6, with *Stammkennzeichen* code VI+AA) and succeeding aircraft, corrected this problem.

The BMW 003 jet engines, which were proving unreliable, were replaced by the newly available [Junkers Jumo 004](http://en.wikipedia.org/wiki/Junkers_Jumo_004). Test flights continued over the next year, but the engines continued to be unreliable. Airframe modifications were complete by 1942, but hampered by the lack of engines, serial production did not begin until 1944, but deliveries were low, with 28 Me 262s in June, 59 in July, but only 20 in August. This delay in engine availability was in part due to the shortage of strategic materials, especially metals and alloys able to handle the extreme temperatures produced by the jet engine. Even when the engines were completed, they had an expected operational lifetime of approximately 50 continuous flight hours; in fact, most 004s lasted just 12 hours, even with adequate maintenance. A pilot familiar with the Me 262 and its engines could expect approximately 20–25 hours of life from the 004s. Changing a 004 engine was intended to require three hours, but this typically took eight to nine due to poorly made parts and inadequate training of ground crews.

Turbojet engines have less thrust at low speed than propellers, and as a result, low-speed acceleration is relatively poor. It was more noticeable for the Me 262 as early jet engines (before the invention of [afterburners](http://en.wikipedia.org/wiki/Afterburner)) responded slowly to throttle changes. The introduction of a primitive [auto throttle](http://en.wikipedia.org/wiki/Autothrottle) late in the war only helped slightly. Conversely, the higher power of jet engines at higher speeds meant the Me 262 enjoyed a much higher [rate of climb](http://en.wikipedia.org/wiki/Rate_of_climb). Used tactically, this gave the jet fighter an even greater speed advantage in climb rate than level flight at top speed.

With one engine out, the Me 262 still flew well, with speeds of 450–500 km/h (280-310 mph), but pilots were warned never to fly slower than 300 km/h (190 mph) on one engine, as the asymmetrical thrust would cause serious problems.

Operationally, the Me 262 had an [endurance](http://en.wikipedia.org/wiki/Endurance_%28aircraft%29) of 60 to 90 minutes.

**Operational history**

Me 262 A-1a

In April 1944, [*Erprobungskommando*](http://en.wikipedia.org/wiki/Erprobungskommando) 262 was formed at [Lechfeld](http://en.wikipedia.org/wiki/Lechfeld) in [Bavaria](http://en.wikipedia.org/wiki/Bavaria) as a test unit (*Jäger Erprobungskommando Thierfelder*) to introduce the 262 into service and train a core of pilots to fly it. On 26 July 1944, *Leutnant* [Alfred Schreiber](http://en.wikipedia.org/wiki/Alfred_Schreiber) with the 262 A-1a W.Nr. 130 017 damaged a [Mosquito](http://en.wikipedia.org/wiki/De_Havilland_Mosquito) reconnaissance aircraft of [No. 540 Squadron RAF](http://en.wikipedia.org/wiki/No._540_Squadron_RAF) PR Squadron, which was allegedly lost in a crash landing upon landing at an air base in Italy. Other sources state the aircraft was damaged during evasive maneuvers and escaped. It was the first victory for a turbojet fighter aircraft in aviation history. [Major](http://en.wikipedia.org/wiki/Major) [Walter Nowotny](http://en.wikipedia.org/wiki/Walter_Nowotny) was assigned as commander after the death of Werner Thierfelder in July 1944, and the unit redesignated [*Kommando Nowotny*](http://en.wikipedia.org/wiki/Kommando_Nowotny). Essentially a trials and development unit, it holds the distinction of having mounted the world's first jet fighter operations. Trials continued slowly, with initial operational missions against the Allies in August 1944 allegedly downing 19 Allied aircraft for six Me 262s lost, although these claims have never been verified by cross-checking with USAAF records. The RAF Museum holds no intelligence reports of RAF aircraft engaging in combat with Me 262s in August, although there is a report of an unarmed encounter between an Me 262 and a Mosquito. Despite orders to stay grounded, Nowotny chose to fly a mission against an enemy formation. After an engine failure, he was shot down and killed on 8 November 1944 by [First Lieutenant](http://en.wikipedia.org/wiki/First_Lieutenant) Edward "Buddy" Haydon of the [357th Fighter Group](http://en.wikipedia.org/wiki/357th_Fighter_Group), USAAF and [Captain](http://en.wikipedia.org/wiki/Captain_%28land%29) Ernest "Feeb" Fiebelkorn of the 20th Fighter Group, USAAF. The *Kommando* was then withdrawn for further [training](http://en.wikipedia.org/wiki/Flight_training) and a revision of combat tactics to optimize the 262's strengths.

Me 262 A, circa 1944/45

By January 1945, [*Jagdgeschwader* 7](http://en.wikipedia.org/wiki/Jagdgeschwader_7) (JG 7) had been formed as a pure jet fighter wing, although it would be several weeks before it was operational. In the meantime, a bomber unit — I *Gruppe*, [*Kampfgeschwader* 54](http://en.wikipedia.org/wiki/Kampfgeschwader_54) (KG 54) — had re-equipped with the Me 262 A-2a fighter-bomber for use in a ground-attack role. However, the unit lost 12 jets in action in two weeks for minimal returns.

[*Jagdverband 44*](http://en.wikipedia.org/wiki/Jagdverband_44) (JV 44) was another Me 262 fighter unit, of *Staffel* (squadron) size given the low numbers of available personnel, formed in February 1945 by [Lieutenant General](http://en.wikipedia.org/wiki/Lieutenant_General) [Adolf Galland](http://en.wikipedia.org/wiki/Adolf_Galland), who had recently been dismissed as [Inspector of Fighters](http://en.wikipedia.org/wiki/Inspector_of_Fighters). Galland was able to draw into the unit many of the most experienced and decorated *Luftwaffe* fighter pilots from other units grounded by lack of fuel.

During March, Me 262 fighter units were able, for the first time, to mount large scale attacks on Allied bomber formations. On 18 March 1945, 37 Me 262s of JG 7 intercepted a force of 1,221 bombers and 632 escorting fighters. They shot down 12 bombers and one fighter for the loss of three Me 262s. Although a 4:1 ratio was exactly what the *Luftwaffe* would have needed to make an impact on the war, the absolute scale of their success was minor, as it represented only one per cent of the attacking force. In 1943 and early 1944, the USAAF had been able to keep up offensive operations despite loss ratios of 5% and more, and the few available Me 262s could not inflict sufficient losses to hamper their operations.

Side view of a Me 262B-1a/U1 night fighter, Wrknr. 110306, note the [radar](http://en.wikipedia.org/wiki/Radar) antenna on the nose and second seat for a radar operator. This airframe was surrendered to the RAF at Schleswig in May 1945.

Several two-seat [trainer](http://en.wikipedia.org/wiki/Trainer_%28aircraft%29) variants of the Me 262, the Me 262 B-1a, had been adapted as [night fighters](http://en.wikipedia.org/wiki/Night_fighter), complete with on-board [FuG 218 *Neptun* radar](http://de.wikipedia.org/wiki/Neptun_%28Radar%29) and *Hirschgeweih* ("stag's antlers") antenna, as the B-1a/U1 version. Serving with 10 *Staffel*, [*Nachtjagdgeschwader* 11](http://en.wikipedia.org/wiki/Nachtjagdgeschwader_11), near Berlin, these few aircraft (alongside several single-seat examples) accounted for most of the 13 Mosquitoes lost over Berlin in the first three months of 1945. However, actual intercepts were generally or entirely made using [*Wilde Sau*](http://en.wikipedia.org/wiki/Wilde_Sau) methods, rather than AI radar-controlled interception. As the two-seat trainer was largely unavailable, many pilots had to make their first flight in a jet in a single-seater without an instructor.

Despite its deficiencies, the Me 262 clearly signaled the beginning of the end of piston-engined aircraft as effective fighting machines. Once airborne, it could accelerate to speeds well over 800 km/h (500 mph), over 150 km/h (90 mph) faster than any Allied fighter operational in the European Theater of Operations.

The Me 262's top ace was probably *Hauptmann* [Franz Schall](http://en.wikipedia.org/wiki/Franz_Schall) with 17 kills which included six four-engine bombers and 10 [P-51 Mustang](http://en.wikipedia.org/wiki/P-51_Mustang) fighters, although night fighter ace *Oberleutnant* [Kurt Welter](http://en.wikipedia.org/wiki/Kurt_Welter) claimed 25 Mosquitos and two four-engine bombers shot down by night and two further Mosquitos by day flying the Me 262. Most of Welter's claimed night kills were achieved in standard radar-less aircraft, even though Welter had tested a prototype Me 262 fitted with [FuG 218 Neptun radar](http://en.wikipedia.org/w/index.php?title=Neptun_(Radar)&action=edit&redlink=1). Another candidate for top ace on the aircraft was [*Oberstleutnant*](http://en.wikipedia.org/wiki/Oberstleutnant) [Heinrich Bär](http://en.wikipedia.org/wiki/Heinrich_B%C3%A4r), who claimed 16 enemy aircraft while flying the Me 262.

**Anti-bomber tactics**

The Me 262 was so fast that new tactics had to be devised to attack American bombers. In the head-on attack, the closing speed, of about 350 yd per second (320 m), was too high for accurate shooting. Even from astern, the closing speed was too great for the short-ranged 30 mm cannon to be used to maximum effect. Therefore, a roller-coaster attack was devised. The 262s approached from astern and about 6,000 ft higher (1,800 m) than the bombers. From about 3 mi behind (4.8 km), they went into a shallow dive that took them through the escort fighters with little risk of interception. When they were about 1 mi astern (1.6 km) and 1,500 feet (460 m) below the bombers, they pulled up sharply to reduce their excess speed. On levelling off, they were 1,000 yd astern (0.91 km) and overtaking the bombers at about 100 mph (160 km/h), well placed to attack them. Since 30 mm cannon were not accurate above 650 yd (590 m), and since it was necessary to break off at 200 yd (180 m) to avoid colliding with the target, Me 262 pilots would normally commence firing at 550 yd (500 m). Allied bomber gunners found their electric gun turrets had problems tracking the jets. Target acquisition was difficult because the jets closed into firing range quickly and remained in firing position only briefly, using their standard attack profile.

Me 262 with R4M under wing rockets on display at the [Technikmuseum Speyer](http://en.wikipedia.org/wiki/Technikmuseum_Speyer), Germany

Eventually, new combat tactics were developed to counter the Allied bombers' defenses. Me 262s, equipped with [R4M rockets](http://en.wikipedia.org/wiki/R4M_rocket), would approach from the side of a bomber formation, where their silhouettes were widest, and while still out of range of the 12.7 mm (.50 in) guns, fire a [salvo](http://en.wikipedia.org/wiki/Salvo) of rockets. The [high explosive](http://en.wikipedia.org/wiki/High_explosive) warhead of only one or two of these rockets was capable of downing even the famously rugged [B-17](http://en.wikipedia.org/wiki/B-17_Flying_Fortress); a strike on an enemy aircraft meant its total annihilation. Although this tactic was effective, it came too late to have a real effect on the war. This method of attacking bombers became the standard until the invention and mass deployment of guided missiles. Some nicknamed this tactic the "*Luftwaffe's* Wolf Pack", as the fighters would often make runs in groups of two or three, fire their rockets, then return to base.

On 1 September 1944, USAAF [General](http://en.wikipedia.org/wiki/General) [Carl Spaatz](http://en.wikipedia.org/wiki/Carl_Spaatz) expressed the fear that if greater numbers of German jets appeared, they could inflict losses heavy enough to force cancellation of the [Allied daylight bombing offensive](http://en.wikipedia.org/wiki/Strategic_bombing_during_World_War_II).

**Counter-jet tactics**

The Me 262 was difficult for its opponents to counter, once in the air, and in fact almost untouchable if flown correctly by an experienced pilot, mostly because of its high speed and rate of climb which made it extremely hard to intercept. But like any other aircraft, the Me 262 had its shortcomings. For example, as with all other early jets, the Me 262's engines did not provide a lot of thrust at low air speeds (a key criterion for good turn performance), and throttle response was slow. Another disadvantage shared by all early jet engines was the relatively high risk of so-called “flame outs” if the throttle was used too aggressively (such as was common in a [dogfight](http://en.wikipedia.org/wiki/Dogfight)). Pilots were therefore instructed to operate the throttle gently and avoid quick changes in setting. Later in the war, an automatic throttle regulator was introduced to try to solve this, but it only partly alleviated the problem. On the plus side, thrust at high speed was much greater than on propeller-driven aircraft.

Furthermore the Me 262 had, by contemporary standards, quite a high wing loading (60.2 lbs./ft2, 294.0 kg/m2) and its turn radius at low speeds was therefore correspondingly wide. This coupled with the slow throttle response and high chance of a flame out, resulted in Me 262 pilots being told to avoid low speed dogfights with the Allied piston engine fighters. The high speed of the Me 262 also presented its own problems when it came to engaging enemy aircraft, the high speed convergence allowing Me 262 pilots precious little time to line up their targets or acquire the appropriate amount of deflection. This is a problem which faces any aircraft which is much faster than its competition, as any aircraft approaching another one from behind at much higher speed will experience that the slower going aircraft in front will always be able to pull a tighter smaller-radius turn, forcing the faster aircraft to overshoot. This was a problem the Me 262 faced a lot, as its cruising speed alone was up to 200 km/h (120 mph) faster than that of any piston-engine fighter of the period. Oberst [Johannes Steinhoff](http://en.wikipedia.org/wiki/Johannes_Steinhoff) experienced this exact problem, himself, once when he encountered a dozen Russian fighters early in 1945, the much higher speed of his Me 262 making it extremely difficult for him to get his guns on the small Russian fighters. He recalled:

“I passed one that looked as if it was hanging motionless in the air (I am too fast!). The one above me went into a steep right-hand turn, his pale blue underside standing out against the purple sky. Another banked right in front of the Me's nose. Violent jolt as I flew through his airscrew eddies. Maybe a wing's length away. That one in the gentle left-hand curve! Swing her round. I was coming from underneath, eye glued to the sight (pull her tighter!). A throbbing in the wings as my cannon pounded briefly. Missed him. Way behind his tail. It was exasperating. I would never be able to shoot one down like this. They were like a sack of fleas. A prick of doubt: is this really such a good fighter? Could one in fact successfully attack a group of erratically banking fighters with the Me 262?”

*Luftwaffe* pilots did however eventually learn how to handle the Me 262's higher speed, and the Me 262 soon proved a formidable air superiority fighter, with pilots such as Franz Schall managing to shoot down 12 enemy fighters in the Me 262, 10 of them being American P-51 Mustangs. Other notable Me 262 aces included [Georg-Peter Eder](http://en.wikipedia.org/wiki/Georg-Peter_Eder), also with 12 enemy fighters to his credit (including 9 P-51s), [Walther Dahl](http://en.wikipedia.org/wiki/Walther_Dahl) with 11 (including three La-7s and six P-51s) and [Heinz-Helmut Baudach](http://en.wikipedia.org/wiki/Helmut_Baudach) with 6 (including 1 Spitfire and 2 P-51s) amongst many others.

Pilots soon learned that the Me 262 was in fact, despite its high wing loading and lack of low speed thrust, quite maneuverable, especially if attention was drawn to its effective maneuvering speeds. The controls were light and effective right up to the max permissible speed and perfectly harmonized. The addition of full span leading edge slats helped increase the overall lift produced by the wing by as much as 25 to 35% in tight turns or at low speeds, greatly improving the aircraft turn performance as well as its landing and takeoff characteristics over what the high wing loading would suggest. (The slats lowered the stalling speed of the aircraft to a respectable 160 to 170 km/h depending on load out.) And as many pilots soon found out, the Me 262's clean design also meant that it, like all jets, held its speed in tight turns much better than conventional propeller driven fighters, which was a great potential advantage in a dogfight as it meant better energy retention in maneuvers. *Luftwaffe* test pilot and flight instructor [Hans Fey](http://en.wikipedia.org/w/index.php?title=Hans_Fey&action=edit&redlink=1) stated, "The 262 will turn much better at high than at slow speeds, and due to its clean design, will keep its speed in tight turns much longer than conventional type aircraft."

As a result, Me 262 pilots were relatively safe from the Allied fighters, as long as they did not allow themselves to get sucked into low speed turning contests and saved their maneuvering for higher speeds. Combatting the Allied fighters could be effectively done the same way as the US Navy fighters fought the more nimble, but slower, Japanese fighters in the Pacific.

In fact, the only reliable way of dealing with the jets, as with the even faster [Me 163 *Komet*](http://en.wikipedia.org/wiki/Messerschmitt_Me_163) rocket fighters, was to attack them on the ground and during takeoff or landing. *Luftwaffe* airfields that were identified as jet bases were frequently bombed by [medium bombers](http://en.wikipedia.org/wiki/Medium_bomber), and Allied fighters patrolled over the fields to attack jets trying to land. The *Luftwaffe* countered by installing [*flak*](http://en.wikipedia.org/wiki/Anti-aircraft_warfare) alleys along the approach lines in order to protect the Me 262s from the ground and providing top cover with the most advanced *Luftwaffe* single engined fighters, the Focke-Wulf Fw 190D *Langnasen-Dora*, and the just-available in 1945 Focke-Wulf Ta 152H fighters, during takeoff and landing. Nevertheless, in March-April 1945, Allied fighter patrol patterns over Me 262 airfields resulted in numerous losses of jets and serious attrition of the force.

**High speed research**

Me 262 interior

Willy Messerschmitt regarded the Me 262 as only an interim type when it went into production.

Swept wings had been proposed as early as 1935 by [Adolf Busemann](http://en.wikipedia.org/wiki/Adolf_Busemann), and Messerschmitt had researched the topic from 1940. In April 1941, he proposed fitting a 35° swept wing (*Pfeilflügel II*, literally "arrow wing II") to the Me 262, the same wing sweep angle that would later be used on both the American [F-86 Sabre](http://en.wikipedia.org/wiki/F-86_Sabre) and Soviet [MiG-15](http://en.wikipedia.org/wiki/MiG-15) fighter jets. Though this was not implemented, he continued with the projected HG II and HG III (*Hochgeschwindigkeit*, "high speed") derivatives in 1944, which were designed with a 35° and 45° wing sweep, respectively.

Interest in high-speed flight, which led him to initiate work on swept wings starting in 1940, is evident from the advanced developments Messerschmitt had on his drawing board in 1944. While the Me 262 HG I actually flight tested in 1944 had only small changes compared to combat aircraft, most notably a low-profile [canopy](http://en.wikipedia.org/wiki/Aircraft_canopy) (tried as the *Rennkabine* (literally "racing cabin") on the Me 262 V9 prototype for a short time) to reduce drag, the HG II and HG III designs were far more radical. The projected HG II combined the low-drag canopy with a 35° wing sweep and a butterfly tail. The HG III had a conventional tail, but a 45° wing sweep and turbines embedded in the [wing roots](http://en.wikipedia.org/wiki/Wing_root).

Messerschmitt also conducted a series of flight tests with the series production Me 262. In dive tests, it was determined that the Me 262 went out of control in a dive at [Mach](http://en.wikipedia.org/wiki/Mach_number) 0.86, and that higher Mach numbers would lead to a nose-down trim that could not be countered by the pilot. The resulting steepening of the dive would lead to even higher speeds and disintegration of the airframe due to excessive negative ([g](http://en.wikipedia.org/wiki/G_force)) loads.

The HG series of Me 262 derivatives was estimated to be capable of reaching transonic Mach numbers in level flight, with the top speed of the HG III being projected as Mach 0.96 at 6,000 m (19,690 ft) altitude. Despite the necessity to gain experience in high-speed flight for the HG II and III designs, Messerschmitt undertook no attempts to exceed the Mach 0.86 limit for the Me 262.

After the war, the [Royal Aircraft Establishment](http://en.wikipedia.org/wiki/Royal_Aircraft_Establishment), at that time one of the leading institutions in high-speed research, re-tested the Me 262 to help with British attempts at exceeding Mach 1. The RAE achieved speeds of up to Mach 0.84 and confirmed the results from the Messerschmitt dive tests. Similar tests were run by the Soviets. No attempts were made to exceed the Mach limit established by Messerschmitt.

After Willy Messerschmitt's death, the former Me 262 pilot [Hans Guido Mutke](http://en.wikipedia.org/wiki/Hans_Guido_Mutke) claimed to be the first person to exceed Mach 1, on 9 April 1945 in a Me 262 in a "straight-down" 90° dive. This claim is disputed because it is only based on Mutke's memory of the incident, which recalls effects other Me 262 pilots observed below the speed of sound at high indicated airspeed, but with no altitude reading required to determine the actual speed. Furthermore, the [pitot tube](http://en.wikipedia.org/wiki/Pitot_tube) used to measure airspeed in aircraft can give falsely elevated readings as the pressure builds up inside the tube at high speeds. Finally, the Me 262 wing had only a slight sweep incorporated for trim ([center of gravity](http://en.wikipedia.org/wiki/Center_of_gravity)) reasons and likely would have suffered structural failure due to divergence at high transonic speeds. One airframe (Me 262 HG1 V9, Werknummer 130 004, with *Stammkennzeichen* of VI+AD) was prepared with the low-profile *Rennkabine* racing canopy and may have achieved an unofficial record speed for a turbojet-powered aircraft of 975 km/h (606 mph), altitude unspecified.

**Production**

Underground manufacture of Me 262s

While Germany was bombed intensively, production of the Me 262 was dispersed into low-profile production facilities, sometimes little more than clearings in the forests of Germany and occupied nations. Through the end of February to the end of March 1945, approximately 60 Me 262s were destroyed in attacks on [Obertraubling](http://en.wikipedia.org/wiki/Obertraubling) and 30 at [Leipheim](http://en.wikipedia.org/wiki/Leipheim) (the [Neuberg](http://en.wikipedia.org/wiki/Neuberg) jet plant was bombed on 19 March.) Large, heavily protected underground factories were constructed to take up production of the Me 262, safe from bomb attacks, but the war ended before they could be completed. At *B8 Bergkristall-Esche II* at St. Georgen/Gusen, Austria, forced labourers of *Concentration Camp Gusen II* produced fully equipped fuselages for the Me 262 at a monthly rate of 450 units on large assembly lines from early 1945. Wings for the Me 262 were produced in Germany's oldest motorway tunnel at [Engelberg](http://en.wikipedia.org/wiki/Engelberg_tunnel) to the west of [Stuttgart](http://en.wikipedia.org/wiki/Stuttgart). In the end, slightly over 1,400 Me 262s of all versions were produced. As few as 200 Me 262s made it to combat units due to fuel shortages, pilot shortages, and the lack of airfields that could support the Me 262.

**Postwar history and flyable reproductions**

Reproduction of a Messerschmitt Me 262 at the [Berlin Air Show](http://en.wikipedia.org/wiki/Berlin_Air_Show) 2006

After the end of the war, the Me 262 and other advanced German technologies were quickly swept up by the Americans (as part of the USAAF's [Operation Lusty](http://en.wikipedia.org/wiki/Operation_Lusty)), British, and Soviets. Many Me 262s were found in readily-repairable condition and were confiscated.

During testing, the Me 262 was found to have advantages over the early models of the [Gloster Meteor](http://en.wikipedia.org/wiki/Gloster_Meteor). It was faster, had better cockpit visibility to the sides and rear (mostly due to the canopy frame and the discoloration caused by the plastics used in the Meteor's construction), and was a superior gun platform, as the early Meteors had a tendency to snake at high speed and exhibited "weak" aileron response. The Me 262 did have a shorter combat range than the Meteor.

The USAAF compared the [P-80 Shooting Star](http://en.wikipedia.org/wiki/P-80_Shooting_Star) and Me 262 concluding, "Despite a difference in gross weight of nearly 907 kg (2,000 lb), the Me 262 was superior to the P-80 in acceleration, speed and approximately the same in climb performance. The Me 262 apparently has a higher critical Mach number, from a drag standpoint, than any current Army Air Force fighter." The Army Air Force also tested an example of the Me 262A-1a/U3 (US flight evaluation serial FE-4012), an unarmed photoreconnaissance version, which was fitted with a fighter nose and given an overall smooth finish. It was used for performance comparisons against the P-80. During testing between May and August 1946, the aircraft completed eight flights, lasting four hours and 40 minutes. Testing was discontinued after four engine changes were required during the course of the tests, culminating in two single-engine landings.

These aircraft were extensively studied, aiding development of early U.S. and Soviet jet fighters. The [F-86 Sabre](http://en.wikipedia.org/wiki/F-86_Sabre), designed by the engineer [Edgar Schmued](http://en.wikipedia.org/wiki/Edgar_Schmued), used the Me 262 airfoil (Messerschmitt Wing A) and a slat design similar to that of the Me 262.

The Czechoslovak aircraft industry continued to produce single-seater (designated **Avia S-92**) and two-seater (designated **Avia CS-92**) variants of the Me 262 after World War II. From August 1946, a total of nine single-seater S-92 and three two-seater CS-92 planes were completed and test flown. They were introduced in 1947 and in 1950 were supplied to the 5th Fighter Squadron, becoming the first jet fighters to serve in the [Czechoslovak Air Force](http://en.wikipedia.org/wiki/Czechoslovak_Air_Force). These were kept flying until 1951 when they were replaced in service by more advanced jet fighters of Soviet origin. Both versions are on display at the [Prague](http://en.wikipedia.org/wiki/Prague) [Aviation museum in Kbely](http://en.wikipedia.org/wiki/Prague_Aviation_Museum%2C_Kbely).

Reproduction of a Messerschmitt Me 262 in 2006

In January 2003, the American [Me 262 Project](http://en.wikipedia.org/wiki/Me_262_Project) completed flight testing to allow for delivery of near-exact reproductions of several versions of the Me 262 including at least two B-1c two-seater variants, one A-1c single seater and two "convertibles" that could be switched between the A-1c and B-1c configurations. All are powered by [General Electric J85](http://en.wikipedia.org/wiki/General_Electric_J85) engines and feature additional safety features, such as upgraded brakes and strengthened landing gear. The "c" suffix refers to the new J-85 powerplant and has been informally assigned with the approval of the Messerschmitt Foundation in Germany (the Werk Number of the reproductions picked up where the last wartime produced Me-262 left off - a continuous airframe serial number run with a 50 year production break). Flight testing of the first newly manufactured Me 262 A-1c (single-seat) variant was completed in August 2005. The first of these machines went to a private owner in the southwestern United States, while the second was delivered to the Messerschmitt Foundation at Manching, Germany. This aircraft conducted a private test flight in late April 2006, and made its public debut in May at the [ILA 2006](http://en.wikipedia.org/wiki/Internationale_Luft-_und_Raumfahrtausstellung). The new Me 262 flew during the public flight demonstrations. Me 262 Werk Number 501241 was delivered to the Collings Foundation as White 1 of JG 7. This aircraft will be offering ride-along flights starting in 2008.

**Variants**

Me 262 A-0

Pre-production aircraft fitted with two Jumo 004B turbojet engines, 23 built.

Me 262 A-1a "*Schwalbe*"

Production version, fighter and fighter/bomber.

Me 262 A-1a/R-1

Equipped with provisions for R4M air-to-air rockets

Me 262 A-1a/U1

Single prototype with a total of six nose mounted guns, two 20 mm [MG 151/20 cannons](http://en.wikipedia.org/wiki/MG_151_cannon), two 30 mm (1.18 in) [MK 103 cannons](http://en.wikipedia.org/wiki/MK_103_cannon), and two 30 mm (1.18 in) [MK 108 cannons](http://en.wikipedia.org/wiki/MK_108_cannon).

Me 262 A-1a/U2

Single prototype with FuG 220 [Lichtenstein SN-2](http://en.wikipedia.org/wiki/Lichtenstein_radar) 90 MHz radar transceiver and *Hirschgeweih* antenna array, for trials as a night-fighter.

Me 262 A-1a/U3

Reconnaissance version modified in small numbers, with *Reihenbilder* RB 20/30 cameras mounted in the nose (sometimes one RB 20/20 and one RB 75/30). Some retained one 30 mm (1.18 in) cannon, but most were unarmed.

Me 262 A-1a/U4

Bomber destroyer version, two prototypes with an adapted 50 mm (2 in) MK 214 (or [BK-5 cannon](http://en.wikipedia.org/wiki/BK-5_cannon)) anti-tank gun in nose.

Me 262 A-1a/U5

Heavy jet fighter with six 30 mm (1.18 in) MK 108s in the nose

Me 262 A-1b

As A-1a but powered with BMW 003 engines. Few were built, two are known to have existed at experimental establishments; maximum speed of 800 km/h (500 mph).

Me 262 A-2a "Sturmvogel"

Definitive bomber version retaining only the two lower 30 mm (1.18 in) MK 108s.

Me 262 A-2a/U1

Single prototype with advanced [bombsight](http://en.wikipedia.org/wiki/Bombsight).

Me 262 A-2a/U2

Two prototypes with glazed nose for accommodating a [bombardier](http://en.wikipedia.org/wiki/Bombardier_%28air_force%29).

Me 262 A-3a

Proposed ground-attack version.

Me 262 A-4a

Reconnaissance version.

Me 262 A-5a

Definitive reconnaissance version used in small numbers at end of the war.

Me 262 B-1a

Two-seat trainer.

Me 262 B-1a/U1

Me 262 B-1a trainers converted into provisional [night fighters](http://en.wikipedia.org/wiki/Night_fighter), FuG 218 *Neptun* radar, with *Hirschgeweih* antenna array.

Me 262 B-2

Proposed night fighter version with stretched fuselage.

Me 262 C-1a

Single prototype [made from Me 262A *Werknummer* 130 186] of rocket-boosted interceptor (*Heimatschützer* I) with [Walter HWK 109-509](http://en.wikipedia.org/wiki/Walter_HWK_109-509) rocket in tail, first flown with combined jet/rocket power on 27 February 1945.

Me 262 C-2b

Single prototype [made from Me 262A *Werknummer* 170 074] of rocket-boosted interceptor (*Heimatschützer* II) with two BMW 003R "combined" powerplants (BMW 003 jet, with a single 1000 kg thrust BMW 718 rocket engine mounted atop the rear of each jet exhaust) for boosted thrust, only flown once with combined jet/rocket power on 26 March 1945. [Video of BMW 718 rocket engine test firing on this aircraft](http://www.xs4all.nl/~jqmgrdyk/jetpower/Me-262-bwm003r.mpg)

Me 262 C-3a

Never-completed. possible *Heimatschützer III* prototype of rocket-boosted interceptor with Walter rocket motor in belly pack.

Me 262 D-1

Proposed variant to carry [*Jagdfaust*](http://en.wikipedia.org/wiki/Jagdfaust) mortars.

Me 262 E-1

Proposed cannon-armed variant based on A-1a/U4.

Me 262 E-2

Proposed rocket-armed variant carrying up to 48 × R4M rockets.

Me 262 S

Zero-series model for Me 262 A-1a

Me 262 V

Test model for Me 262

Me 262 W

Provisional designation for Me 262 with pulse-jet engines

**Postwar variants**

Avia S-92, the [Czechoslovak](http://en.wikipedia.org/wiki/Czechoslovakia)-built Me 262A

[Avia](http://en.wikipedia.org/wiki/Avia) S-92

Czech-built Me 262 A-1a (fighter

Avia CS-92

Czech-built Me 262 B-1a (fighter trainer, two seats)

**Reproductions**

These reproductions are constructed by Legend Flyers (later [Me 262 Project](http://en.wikipedia.org/wiki/Me_262_Project)) of [Everett, Washington](http://en.wikipedia.org/wiki/Everett%2C_Washington). The Jumo-004 engines of the original are replaced by more reliable [General Electric J85](http://en.wikipedia.org/wiki/General_Electric_J85) engines. The first Me 262 reproduction (a two-seater) took off for the first time in December 2002 and the second one in August 2005. This one was delivered to the Messerschmitt Foundation and was presented at the ILA airshow in 2006.

A-1c

American privately built, based on A-1a configuration.

B-1c

American privately built, based on B-1a configuration.

A/B-1c

American privately built, convertible between A-1a and B-1a configuration.

**Operators**

* [*Luftwaffe*](http://en.wikipedia.org/wiki/Luftwaffe)
* [Czechoslovak Air Force](http://en.wikipedia.org/wiki/Czechoslovak_Air_Force) (Postwar, nine S-92 and three CS-92)

**Survivors**

Me 262B-1a/U1 (Red 8)

Me 262 B-1a (White 35)

Me 262A and its [Junkers Jumo 004](http://en.wikipedia.org/wiki/Junkers_Jumo_004) turbojet engine (Yellow 5)

Me 262A, W.Nr.500071 "White 3", III./JG 7

[Deutsches Museum](http://en.wikipedia.org/wiki/Deutsches_Museum), Munich, Germany. This aircraft, flown by [Hans Guido Mutke](http://en.wikipedia.org/wiki/Hans_Guido_Mutke) while a pilot of 9. Staffel/*JG* 7, was confiscated by Swiss authorities on 25 April 1945 after Mutke made an emergency landing in Switzerland due to lack of fuel (80 liters were remaining, 35 liters were usually burnt in one minute).

Me 262 A-1a

Reconstructed from parts of crashed and incomplete Me 262s. [*Luftwaffenmuseum der Bundeswehr*](http://en.wikipedia.org/wiki/Luftwaffenmuseum_der_Bundeswehr), Germany.

Me 262 A-1a W.Nr.501232 "Yellow 5", 3./KG(J)6

[National Museum of the United States Air Force](http://en.wikipedia.org/wiki/National_Museum_of_the_United_States_Air_Force), Wright-Patterson Air Force Base, Dayton, Ohio, USA.

Me 262 A-1a/U3 W.Nr.500453

[Flying Heritage Collection](http://en.wikipedia.org/wiki/Flying_Heritage_Collection), [Arlington, Washington](http://en.wikipedia.org/wiki/Arlington%2C_Washington), USA, scheduled to reopen in [Everett, Washington](http://en.wikipedia.org/wiki/Everett%2C_Washington) in Summer 2008, currently under restoration in England.

Me 262 A-1a W.Nr.500491 "Yellow 7", II./JG 7

[Smithsonian Institution](http://en.wikipedia.org/wiki/Smithsonian_Institution), Washington, DC, USA.

Me 262 A-2a W.Nr.112372

[RAF Museum](http://en.wikipedia.org/wiki/RAF_Museum) Hendon, United Kingdom.

Me 262 A-2a W.Nr.500200 "Black X 9K+XK", II./KG 51

[Australian War Memorial](http://en.wikipedia.org/wiki/Australian_War_Memorial), Canberra, Australia.

Me 262 B-1a/U1, W.Nr.110305 "Red 8"

[South African National Museum of Military History](http://en.wikipedia.org/wiki/South_African_National_Museum_of_Military_History), Johannesburg, South Africa.

Me 262 B-1a, W.Nr.110639 "White 35"

[NAS](http://en.wikipedia.org/wiki/Naval_Air_Station_Willow_Grove) [Willow Grove, Pennsylvania](http://en.wikipedia.org/wiki/Willow_Grove%2C_Pennsylvania), USA.

Avia S-92

[Prague Aviation Museum, Kbely](http://en.wikipedia.org/wiki/Prague_Aviation_Museum%2C_Kbely), [Prague](http://en.wikipedia.org/wiki/Prague), Czech Republic.

Avia CS-92

Aviation Museum Kbely, Prague, Czech Republic.

**Popular culture**

* The American hard rock band [Blue Öyster Cult](http://en.wikipedia.org/wiki/Blue_%C3%96yster_Cult) portrayed an Me 262 on the cover of their third album [*Secret Treaties*](http://en.wikipedia.org/wiki/Secret_Treaties) (1974). The album also contains a song, "Me 262", written from the point of view of a *Luftwaffe* pilot on a bomber interception mission in April 1945.
* [Clive Cussler](http://en.wikipedia.org/wiki/Clive_Cussler)'s famous fictional character [Dirk Pitt](http://en.wikipedia.org/wiki/Dirk_Pitt) owns an Me 262, which he acquired when he helped excavate a hidden airfield that held a number of the aircraft.
* In the PC flight-simulator [*Chuck Yeager's Air Combat*](http://en.wikipedia.org/wiki/Chuck_Yeager%27s_Air_Combat), a virtual [Chuck Yeager](http://en.wikipedia.org/wiki/Chuck_Yeager) voiced by himself, accurately states that Allied pilots used the term *Blow Job* as a nickname for the Me 262s.

**Specifications (Messerschmitt Me 262 A-1a)**

*Data from* Quest for Performance Original Messerschmitt documents

**General characteristics**

* Crew: 1
* Length: 10.60 m (34 ft 9 in)
* [Wingspan](http://en.wikipedia.org/wiki/Wingspan): 12.60 m (41 ft 6 in)
* Height: 3.50 m (11 ft 6 in)
* Wing area: 21.7 m² (234 ft²)
* [Empty weight](http://en.wikipedia.org/wiki/Manufacturer%27s_Weight_Empty): 3,795 kg (8,366 lb)
* Loaded weight: 6,473 kg (14,272 lb)
* [Max takeoff weight](http://en.wikipedia.org/wiki/Maximum_Takeoff_Weight): 7,130 kg (15,720 lb)
* Powerplant: 2× [Junkers Jumo 004](http://en.wikipedia.org/wiki/Junkers_Jumo_004) B-1 [turbojets](http://en.wikipedia.org/wiki/Turbojet), 8.8 kN (1,980 lbf) each
* [Aspect ratio](http://en.wikipedia.org/wiki/Aspect_ratio_%28wing%29): 7.32

Performance

* [Maximum speed](http://en.wikipedia.org/wiki/V_speeds#Vno): 900 km/h (559 mph)
* [Range](http://en.wikipedia.org/wiki/Range_%28aircraft%29): 1,050 km (652 mi)
* [Service ceiling](http://en.wikipedia.org/wiki/Ceiling_%28aeronautics%29): 11,450 m (37,565 ft)
* [Rate of climb](http://en.wikipedia.org/wiki/Rate_of_climb): 1,200 m/min (At max weight of 7,130 kg) (3,900 ft/min)
* [Thrust/weight](http://en.wikipedia.org/wiki/Thrust-to-weight_ratio): 0.28

**Armament**

* **Guns:** 4 × 30 mm [MK 108 cannons](http://en.wikipedia.org/wiki/MK_108_cannon) (A-2a: two cannons)
* **Rockets:** 24 × 55 mm (2.2 in) [R4M rockets](http://en.wikipedia.org/wiki/R4M_rocket)
* **Bombs:** 2 × 250 kg (551 lb) bombs or 2 × 500 kg (1,102 lb) bombs (A-2a only)

**See also**

**Comparable aircraft**

* [Gloster Meteor](http://en.wikipedia.org/wiki/Gloster_Meteor)
* [Heinkel He 280](http://en.wikipedia.org/wiki/Heinkel_He_280)
* [P-59 Airacomet](http://en.wikipedia.org/wiki/P-59_Airacomet)
* [P-80 Shooting Star](http://en.wikipedia.org/wiki/P-80_Shooting_Star)
* [Nakajima J9Y](http://en.wikipedia.org/wiki/Nakajima_J9Y)
* [Nakajima Ki-201](http://en.wikipedia.org/wiki/Nakajima_Ki-201)
* [Sukhoi Su-9 (1946)](http://en.wikipedia.org/wiki/Sukhoi_Su-9_%281946%29)

**Related lists**

* [List of World War II jet aircraft](http://en.wikipedia.org/wiki/List_of_World_War_II_jet_aircraft)
* [Adolf Galland](http://en.wikipedia.org/wiki/Adolf_Galland)
* [Wunderwaffen](http://en.wikipedia.org/wiki/Wunderwaffen)